Operations

Reported by Robert M. Miller

ALS operations continued on a 3-shift-per-day, 7-day-per-week schedule, with 14 to 20 user shifts per week. Operational efficiency (beam delivered versus beam scheduled) was about 94 percent. We continued using the schedule put in place last year, which reduced scheduled maintenance time and increased the number of day shifts available for user operations during the work week.

Long-term scheduling is done at least six months in advance by the Users' Executive Committee and ALS management representatives. Weekly scheduling meetings coordinate the short-term needs of user operations and maintenance and installation activities. A well-attended weekly ALS Users Forum brings ALS users and staff together for informal discussions and information exchange.

The Beamlines Operations Section, part of the Scientific Support Group, has continued to expand, adding associate beamline scientists and operations coordinator support. Mechanical technician support is now on available on the evening shift. Two accelerator operators were hired to fill openings created by a retirement and a reassignment to an associate beamline scientist position. Training of operations staff and documentation of procedures in compliance with DOE Conduct of Operations standards was a significant ongoing activity.

About 3/4 of the user operation time was at 1.9 GeV (up from about 2/3 last year), the rest being at 1.5 GeV, and we provided two weeks of 1.9-GeV two-bunch operation. (The femtosecond x-ray experiments, which use the linac beam rather than the storage ring beam, are among those carried out during 1.5 GeV operation.) A "camshaft" high-current single-bunch mode, which allows time-resolved and time-of-flight measurements, was available on request. In 1999, this mode will need to be requested at least a week in advance to prevent conflicts with other user operations. There were no major outages during 1998.

Improvement of both short- and long-term beam stability is always a major area of interest. Stability from fill to fill continued to be improved; a highlight was refinement of the "one button fill routine" using MATLAB to carry out a set of predetermined routines at each fill. A machine setup period precedes each energy change, to correct the orbit and to set up the beam feedforward and feedback systems. Accelerator Physics staff began training the operators to carry out these setup tasks.

A new 450-ton chiller unit was commissioned in Fall 1998 to supply all the chilled water needs for the ALS complex. This improved the temperature stability of the storage ring by eliminating the need to switch on an additional chiller during warm weather. The storage ring rf water system was identified as a source of vibration, affecting Beamline 1.4, the infrared beamline. This situation was improved by reducing the diameter of the water pump impellers and installing variable-frequency drives to allow the pumps to be operated at a lower speed. A team of ALS physicists, users, and mechanical and operations staff continue to identify and characterize vibration and noise sources and develop plans for mitigation. This will be an ongoing activity.

A variety of improvements to the storage ring and its experimental facilities and procedures were implemented. An elliptically polarized undulator was commissioned in 1998, and we began to allow changes in its vertical gap during user operations. Orbit correction for the polarization mode has been tested and will be implemented in Spring 1999. Finally, third-harmonic cavities will be installed and commissioned in June 1999. This will increase beam lifetime by lengthening the beam bunches, with the goal of being able to refill the storage ring every 12 hours instead of every four hours.